WHAT IS CLAIMED IS:

Sub A1

1. A process for producing a semiconductor device, comprising the steps of: using a grindstone formed of abrasive grains and a binder for binding and retaining the abrasive grains; feeding a dispersant-containing processing liquid to a surface of the grindstone; and polishing and planarizing the surface of a semiconductor wafer so as to expose at least two different thin films formed on the surface of the semiconductor wafer during a part or whole of processing time.

2. A process according to claim 1, wherein said at least two different thin films include a film mainly containing silicon dioxide and a film mainly containing silicon nitride.

3. A process according to claim 1, wherein a concentration of the dispersant in the processing liquid is changed during processing.

4. A process according to claim 1, wherein at least 99% of the abrasive grains has a particle size of 0.001 μm or greater but not greater than 1 μm.

5. A process according to claim 1, wherein a surfactant is employed as the dispersant added to the processing liquid.

6. A process according to any one of claims 1 to 5, wherein a polycarboxylate is employed as the dispersant added to the processing liquid.

7. A process according to claim 1, wherein

ammonium polyacrylate is used as the polycarboxylate.

8. A process according to claim 7, wherein the concentration of ammonium polyacrylate ranges from 0.05 wt.% to 5 wt.%.

9. A process according to claim 7 or 8, wherein ammonium polyacrylate has a molecular weight ranging from 100 to 200000.

10. A process according to claim 1 or 4, wherein the grindstone including, cerium dioxide, aluminum oxide, silica, zirconium oxide, manganese oxide, titanium oxide or magnesium oxide or mixture thereof as the abrasive grains is employed.

11. A process for producing a semiconductor device, comprising the steps of: using a grindstone formed of abrasive grains and a binder for binding and retaining the abrasive grains; feeding a dispersant-containing processing liquid to the surface of the grindstone; and polishing and planarizing the surface of a semiconductor wafer over which a silicon nitride film and a silicon oxide film have been stacked one after another, wherein the dispersant has a concentration permitting a removal rate ratio of the silicon oxide film not less than 20 relative to the silicon nitride film.

12. A process according to claim 11, wherein the concentration of the dispersant ranges from 1 wt.% to 4 wt.%.

13. A process according to claim 11, wherein any

one of ammonium polyacrylate, polycarboxylates, polyoxyethylene derivatives, phosphate condensates, lignin sulfonate, aromatic sulfonate formalin condensates and alkylamines is used as the dispersant.

14. A process for fabricating a semiconductor device, comprising the steps of: using a grindstone formed of abrasive grains and a binder for binding and retaining the abrasive grains; feeding a dispersant-containing processing liquid to the surface of the grindstone; and polishing and planarizing the surface of a semiconductor wafer over which a silicon nitride film and a silicon oxide film have been stacked one after another; wherein the dispersant is fed at a low concentration an initial stage of polishing, followed by an increase in the concentration.

15. A process according to claim 14, wherein the concentration of the dispersant is 1% or less at the initial stage and then it is increased to 1.5% or greater.

16. A process for fabricating a semiconductor device, comprising the steps of: using a grindstone formed of abrasive grains and a binder for binding and retaining the abrasive grains; feeding a dispersant-containing processing liquid to the surface of the grindstone; and polishing and planarizing the surface of a semiconductor wafer over which a silicon nitride film and a silicon oxide film have been stacked one after another; wherein the processing liquid is

supplied while setting the concentration of the dispersant within a range permitting a removal rate of the silicon nitride film once decreased to a low level and maintained at substantially the same low level and a removal rate of the silicon oxide film once increased to a high level and maintained at substantially the same high level.

17. A process according to claim 16, wherein the processing liquid is supplied while setting the concentration of the dispersant within a range permitting a removal rate of the silicon nitride film once decreased to a low level and maintained at substantially the same low level and a removal rate of the silicon oxide film decreased from the maximum value.

18. A process according to claim 16, wherein the dispersant has a lowered viscosity.

~~19~~. A production process of a semiconductor device, comprising at least the following steps:

forming a silicon nitride film over a semiconductor substrate and then forming a trench for isolation region in the semiconductor substrate;

forming an insulating film over said trench for isolation region and said silicon nitride film;

using a grindstone formed of abrasive grains and a binder for binding and retaining the abrasive grains, feeding a dispersant-containing processing liquid to the surface of the grindstone, polishing the

surface of the semiconductor substrate, thereby planarizing said insulating film, and leaving the insulating film only in said trench for isolation region; and

removing the silicon nitride film from the substrate in a region other than the isolation region.

20. A process according to claim 19, wherein in the step for planarizing said insulating film and removing the silicon nitride film by polishing, the surface of the semiconductor substrate is polished using the processing liquid having a dispersant concentration permitting a removal rate ratio of the silicon oxide film not less than 20 relative to the silicon nitride film.

21. A process according to claim 19, wherein in the step for planarizing said insulating film and removing the silicon nitride film by polishing, the surface of the semiconductor substrate is polished by supplying the processing liquid having a dispersant concentration set low at an initial stage of polishing and then supplying the processing liquid having an increased concentration.

22. A process according to claim 19, wherein in the step for planarizing said insulating film and removing the silicon nitride film by polishing, the surface of the semiconductor substrate is polished by feeding the processing liquid having a dispersant concentration within a range permitting a removal rate

of the silicon nitride film once decreased to a low level and maintained at substantially the same low level and a removal rate of the silicon oxide film once increased to a high level and maintained at substantially the same high level.